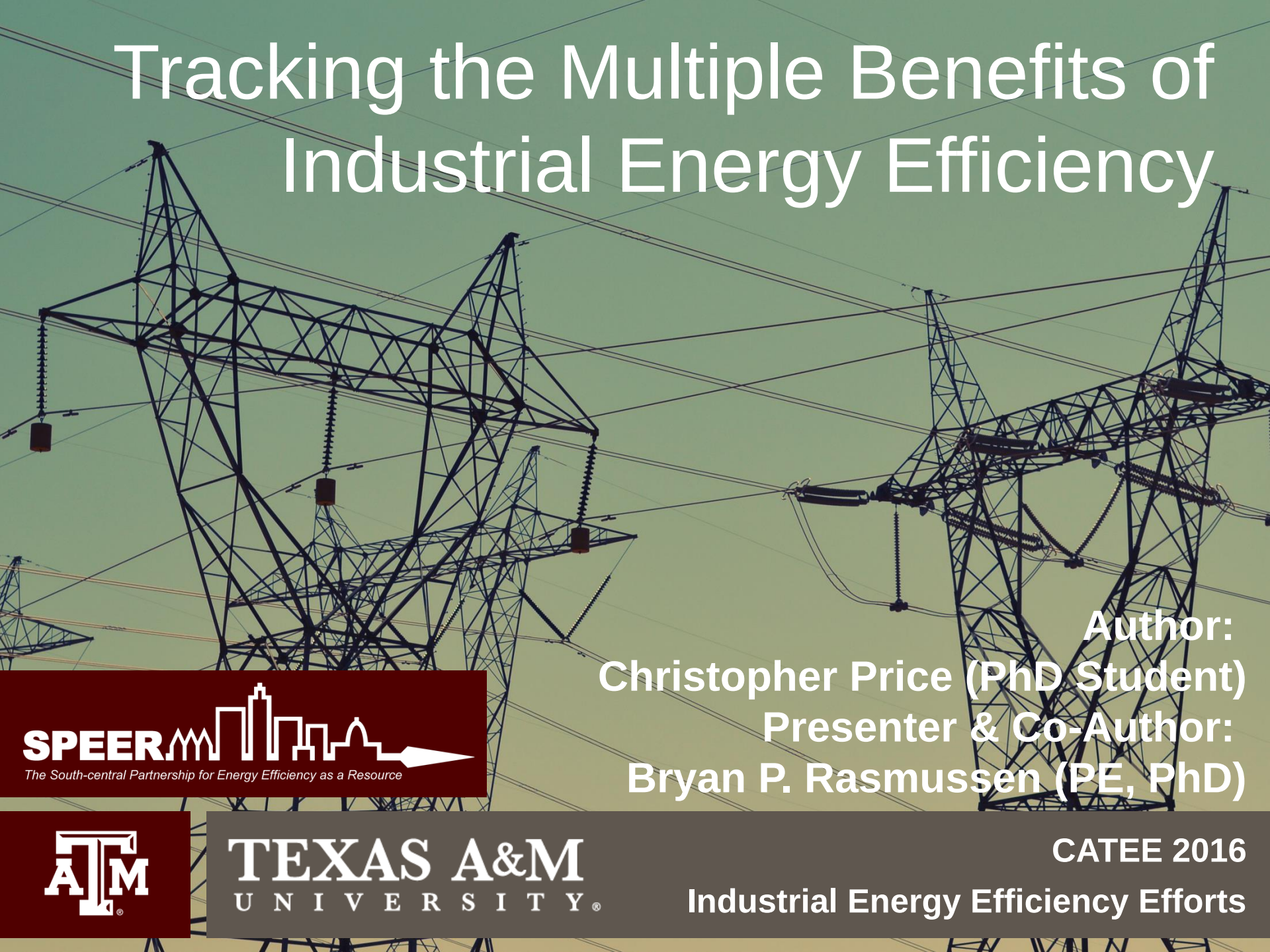
Tracking the Multiple Benefits of Industrial Energy Efficiency



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SPEER
The South-central Partnership for Energy Efficiency as a Resource

TEXAS A&M UNIVERSITY

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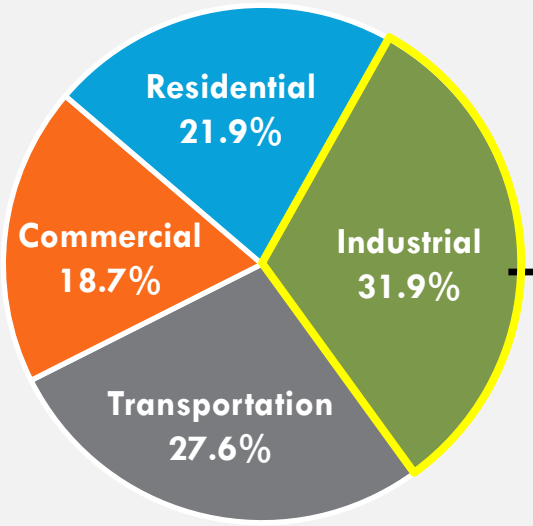
Industrial Energy Efficiency Efforts

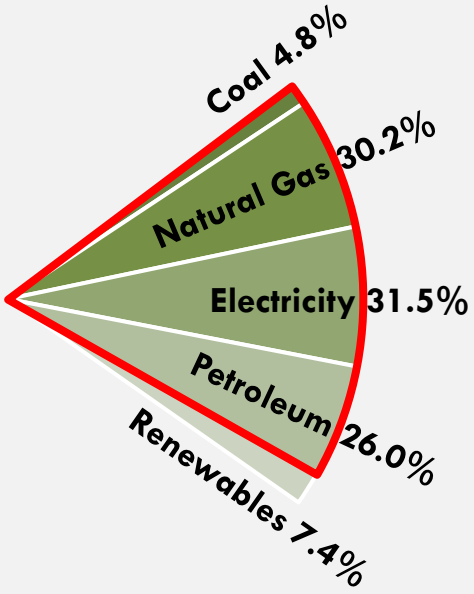
Background

Industrial Energy Efficiency has Multiple Benefits

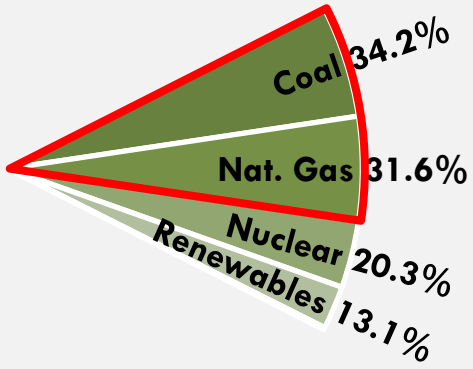
US Energy Consumption[1]



Industrial Energy Consumption[1]



Electricity Fuel Sources[2]



Energy Efficiency Can:

- Reduce Total Energy Demand
- Improve Local Air Quality (NO_x)
- Reduce Environmental Impacts (CO_2)

Background

Industrial Energy Efficiency is a Good Investment

Large Contributor [2-3]

- 33% of Total Energy Usage
- 18% of Total CO_2 Output

Cost Effective [4]

- Program Dollars
- Large Consumers

Economic Benefits [4]

- Power Producers
- Consumers

Potential for Wide Implementation [5]

- Incentives & Program Structure
- Longer Program Windows

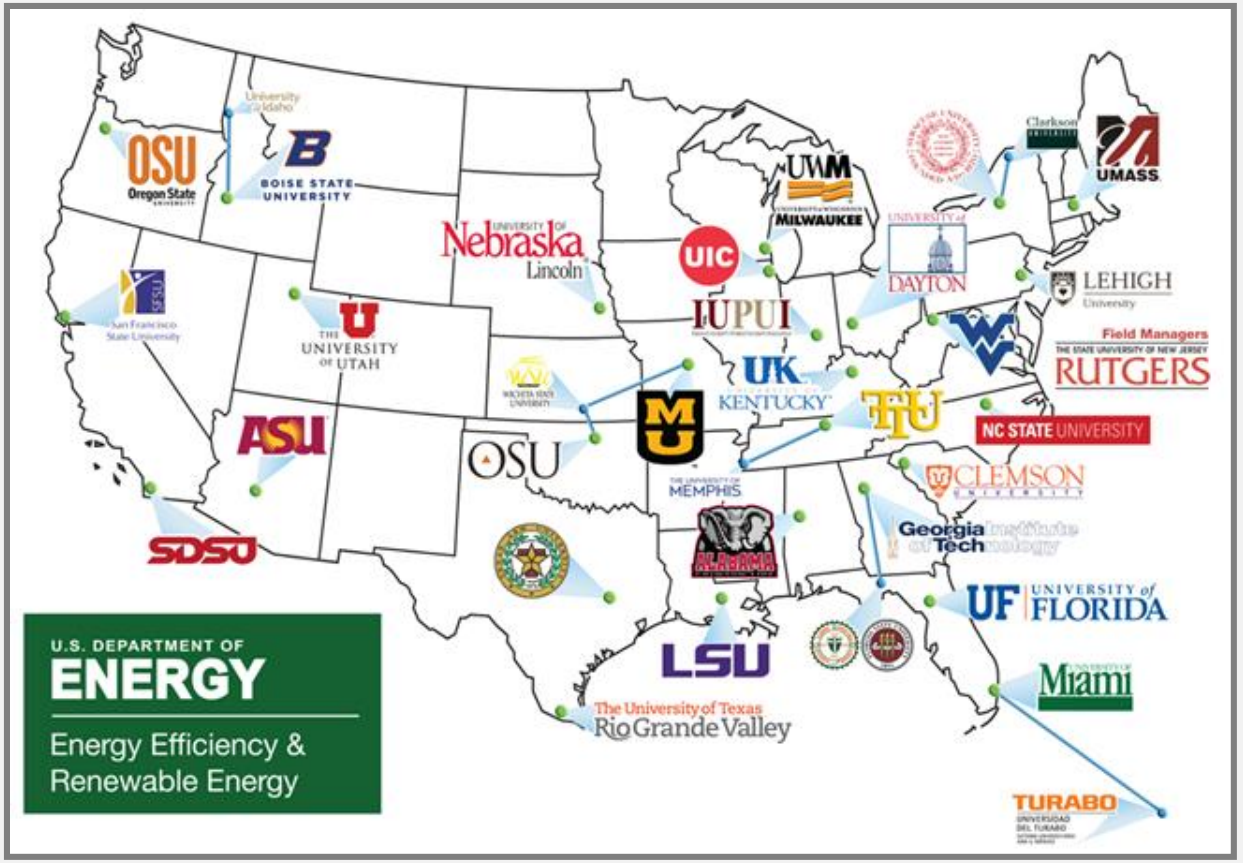
Despite clear benefits, large manufacturers in 12 states still choose to opt-out of energy efficiency programs [6]

Outline

- Feasibility of Common Efficiency Recommendations
- Tracking of Emissions Reductions
- Framework for Tracking Efficiency Benefits
- Preliminary Data
- Industrial Energy Efficiency Policy

Feasibility Study

Industrial Assessment Centers

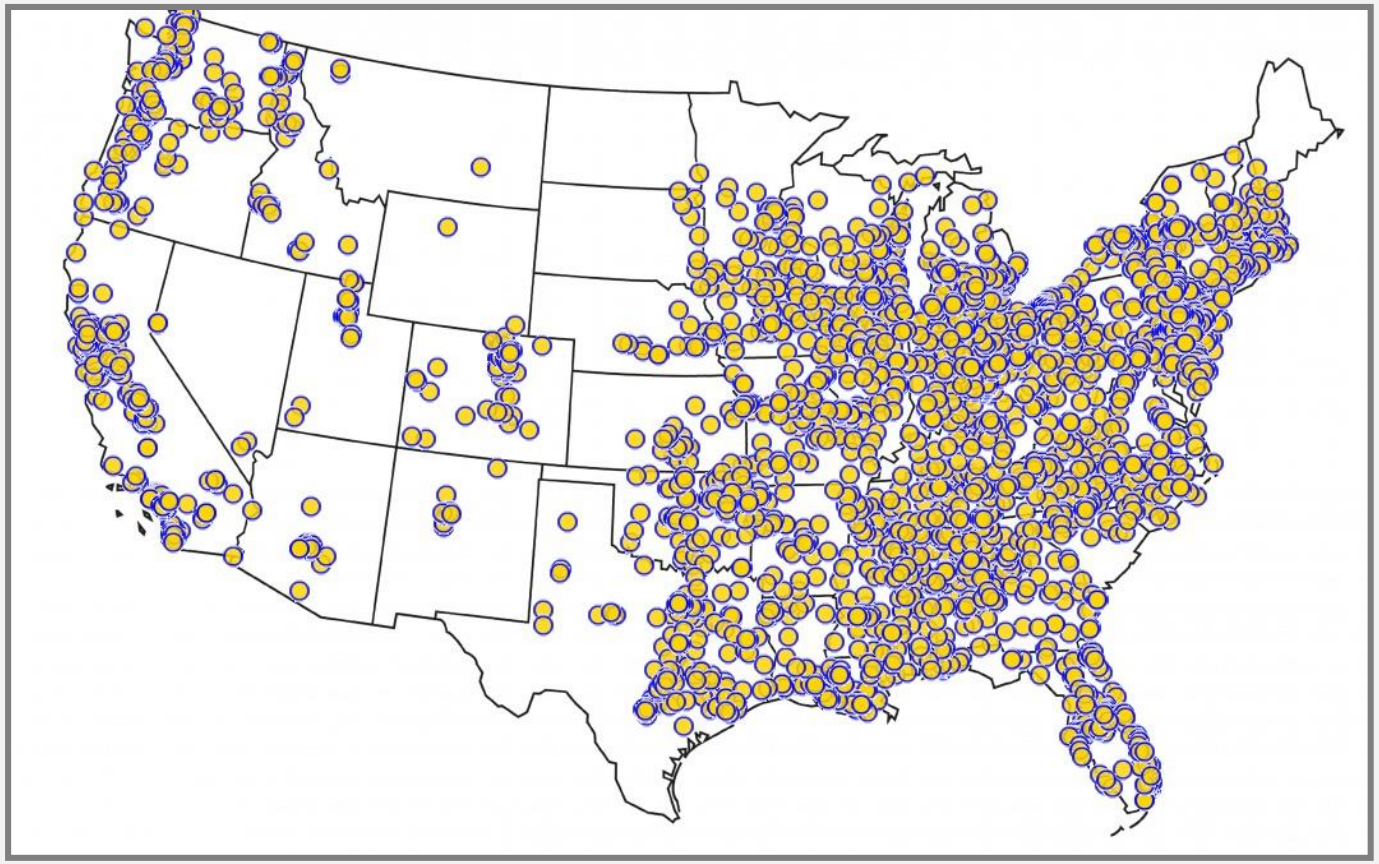


Provide free energy audits for small-to-medium industries in all 50 states.

Maintain a public database of efficiency projects from more than 17,000 facility audits[7].

Feasibility Study

Industrial Assessment Centers



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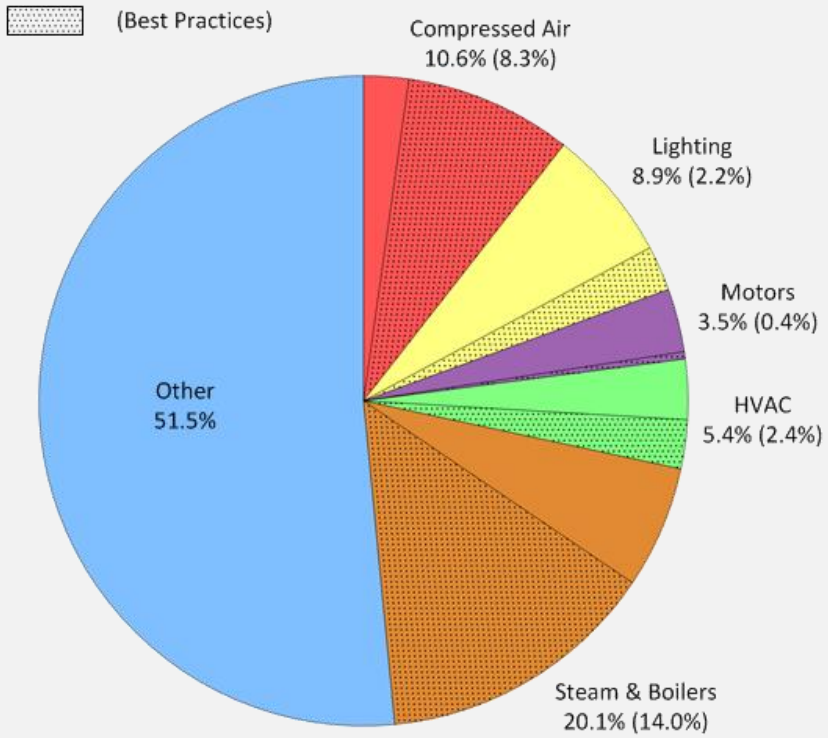
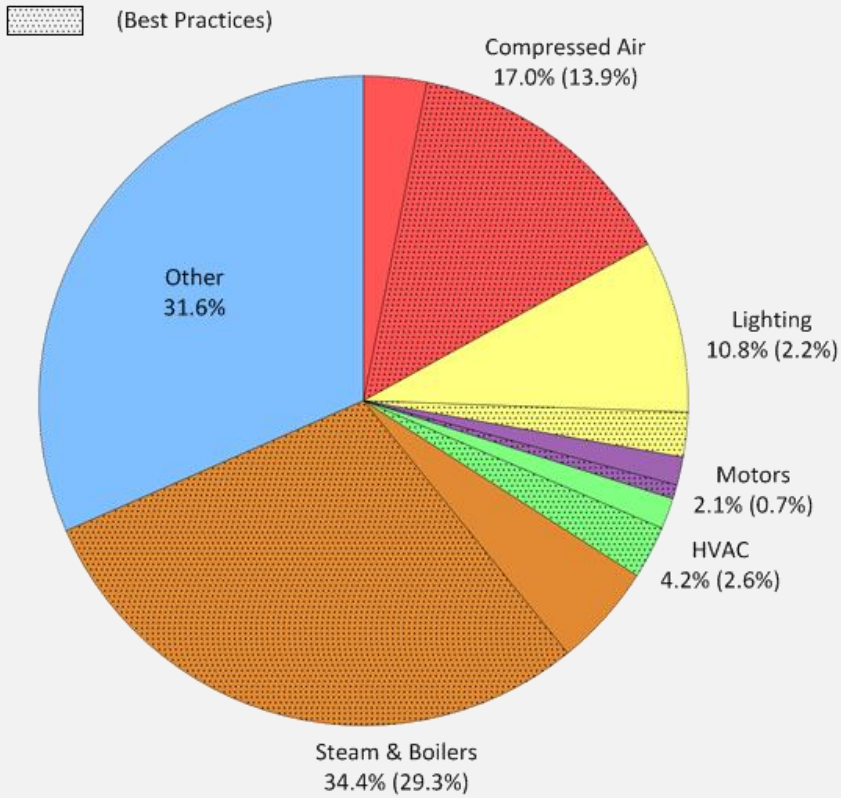
Feasibility Study

Manufacturers Focus on Common Plant Systems [8]

CO_2 Emissions Savings from IAC Energy Efficiency Projects (2005-2014)



Proposed



Implemented

Feasibility Study

Efficiency Projects with Largest Aggregate Savings

Easy

Medium

Hard

Recommendation	IAC Rec. Rate	Avg. Electricity (kWh/yr)	Avg. Nat. Gas (MMBtu/yr)
Equipment Changes			
Insulate Equipment	36%	88,600	2,675
Repair Air Leaks	78%	182,600	5
Replace Existing Lighting	78%	148,900	0
Operational Changes			
Boiler Tune-Up	7%	0	2,240
Reduce Comp. Air Setpoint	39%	66,200	0
Use MS/VS Drive Motors	14%	428,100	295
Behavioral Changes			
Turn Off Equipment	14%	180,600	375
Turn Off Lights	69%	64,400	0
Reduce Space Conditioning	23%	137,400	85

Feasibility Study

Large Potential Savings for Key Recommendations

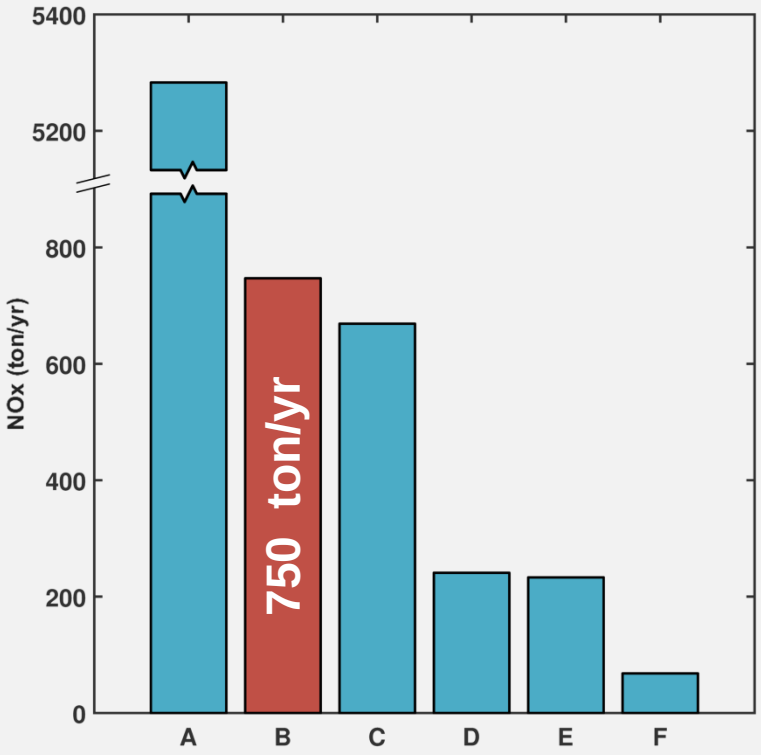
Texas Emission Reduction Plan (TERP) is a multi-pronged effort to reduce emissions.

Programs include:

- A: Wind Power Generation
- C: Utility Energy Efficiency
- D: Higher Edu. & Gov. Agency Goals
- E: New Home Construction Codes
- F: Residential AC Retrofits

Focus on projects with largest aggregate savings in small-to-medium industries (B) could save up to 750 tons of NO_x annually.

2014 TERP NO_x Savings[8-9]

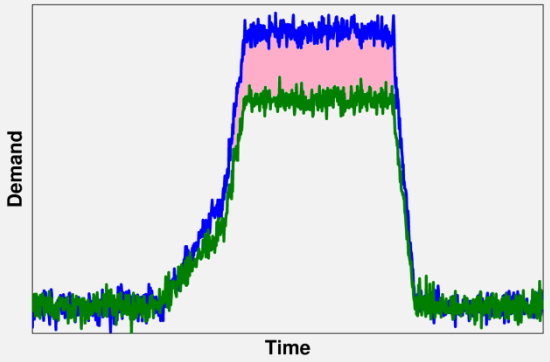


Initial focus is on easily verifiable projects with large aggregate savings.

Tracking Emissions

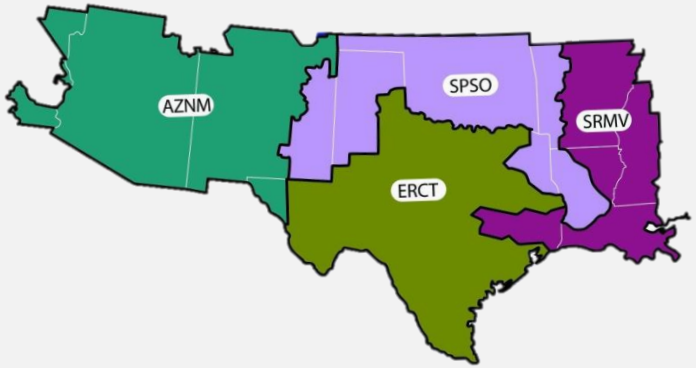
Effect of Efficiency on the Grid

In the near term, efficiency projects will reduce peak load demand on the grid.



Complex power flows on integrated grids make average emission factors a practical choice.

The efficiency tracking database uses eGrid peak load, sub-region emission factors for Texas and Oklahoma [10].



Database Framework

Database Participation is Simple

Identification

1

Discovery and documentation of energy efficiency opportunity internally or with assistance from outside programs such as the IAC, Better Plants, TAPs, or ESCOs.

Implementation

2

Implementation of identified project by in-house plant personnel or by outside contractors. Documentation of install process.

Verification

3

Verification of efficiency project energy savings can be done internally using approved procedures or by a third-party such as the IAC.

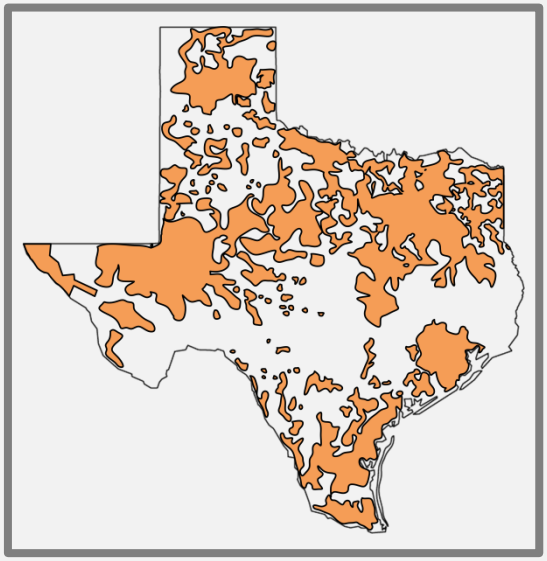
Reporting

4

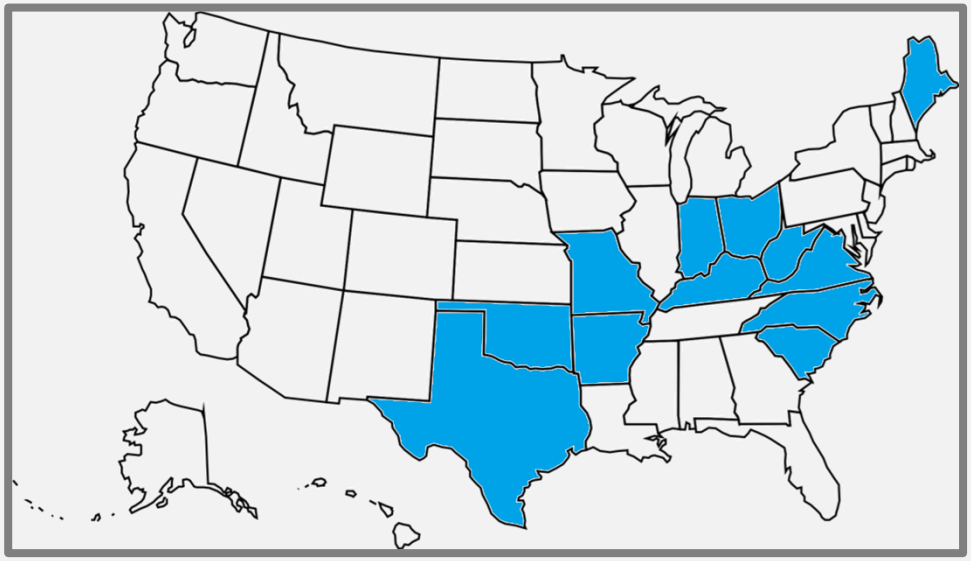
Verified energy savings are reported through future program administrators. Facilities interested in participating should contact SPEER.

Database Framework

Eligible Participants



Investor Owned Utilities in Texas.



States Allowing Large Consumer Efficiency Opt-Out

Large commercial or industrial facilities in Investor Owned Utility (IOU) territories.

Facilities that have opted-out of utility efficiency programs.

Projects reported by facility or Energy Service Company (ESCO) subject to random audit.

Data hosted on secure server anonymously and in aggregate.

Database Framework

Terminology to Describe Implementation

Verification Levels

Third Party Verified (3PV):
Savings verified an by outside, independent auditing organization such as the IAC program.

Self-Verified (SV):
Savings verified by manufacturer completing an approved verification procedure.

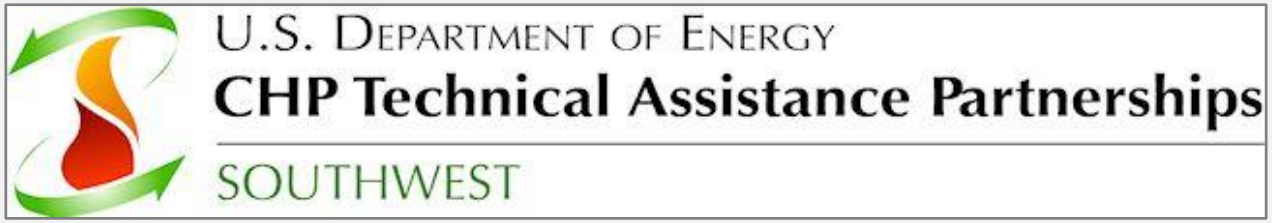
On-site Verification (+):
Additional designation indicating that installation and savings were verified on-site by a third party.

Implementation Levels

Manufacturers only receive credit for projects with measureable savings.

Preliminary Data

Preliminary Dataset Seeks to Include Range of Clients and Programs



Initial dataset includes 65 former IAC clients in Texas & Oklahoma representing annual verified savings of more than 22.8 million kWh, 15,500 tons CO_2, and 12,800 kg NO_x.

Identification of recent CHP client willing to share data and participate in upcoming pilot.

Dialog with Better Plants to include eligible showcase clients with verified savings.

Industrial Efficiency Policy

Texas

- 1997 SB7 rule requires 10% of annual growth be offset by energy efficiency.
- Texas allows consumers to opt-out of efficiency program participation.
- The 2001 Texas Emissions Reduction Plan covers home construction, diesel engines, utility efficiency programs and green power generation.

Oklahoma

- 90% of eligible customers opt-out of efficiency programs
- The Oklahoma Municipal Power Authority (OMPA) offers the Demand and Energy Efficiency Program (DEEP) to encourage upgrades that cut summer peak demand (HVAC, lighting, ect.).

Trend toward voluntary reporting programs allow industry leaders to be recognized as contributors and count savings toward state initiatives.

Conclusions

Development of Tracking Framework

- Calculation of emissions using sub-region factors
- Development of terminology and framework
- Creation of initial dataset from diverse DOE programs

Efficiency Tracking Pilot Program

- Seeking manufacturing and industrial facilities willing to participate in initial database
- Demonstration of viability to capture industrial efficiency
- Use data to participate in company, state, and regional efforts towards sustainability and public health

Acknowledgements

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Questions?